

REMARKS

This amendment is filed in response to the final Office Action dated May 3, 2007, pursuant to 37 C.F.R. § 1.116. In view of these amendments and remarks, this amendment should be entered, the application allowed, and the case passed to issue.

No new matter or considerations are introduced by this amendment, and this amendment clearly places the application in condition for allowance. The amendment to claim 1 is supported by the specification at the first full paragraph on page 13 and page 24, lines 4-12. Claim 9 is clarified. As is well-known in this art, secondary particles are formed from primary particles.

Claims 1-14 are pending in this application. Claim 13 is withdrawn from consideration pursuant to an election of species requirement. Claims 1-12 and 14 are rejected. Claims 1 and 9 are amended in this response.

Information Disclosure Statement

The Office Action did not include an initialed copy of the PTO-1449 filed May 1, 2007. It is respectfully requested that the Examiner consider the references cited in the Information Disclosure Statement filed May 1, 2007 and include a copy of the initialed PTO-1449 in the next official action.

Claim Rejections Under 35 U.S.C. § 112

Claims 4 and 7 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because R3-m was unclear. The Examiner alleged that Exhibit 1 attached to our response of February 20, 2007, showing the hexagonal structure of a lithium transition metal oxide, was not submitted. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Contrary to the Examiner's assertion, Exhibit 1 was submitted February 20, 2007. The United States Patent and Trademark Office's (USPTO) image scanning department no longer scans all attachments to responses. Rather, a paper copy of the attachment, which the USPTO calls an artifact, is maintained by the USPTO and can be obtained by the Examiner. For the Examiner's convenience, another copy of Exhibit 1 is attached to this response.

One of ordinary skill in this art would know that R3-m is a known crystal structure, as evidenced by the Ohzuku et al. references that the Examiner cited as prior art (*see* Ohzuku et al., Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, p. 642; and Ohzuku et al., Chemistry Letters, CL-010410, Vol. 30 (2001), No. 8, p. 744). As is well known in crystallography, an R-3m structure belongs to rhombohedral structures. The rhombohedral structure is a subset of hexagonal crystal structures and are often replaced with hexagonal structures. Hexagonal structures include crystal lattices 3 times as much as rhombohedral structures. An axis relation of hexagonal structures is simpler than that of rhombohedral structures. Thus, the rhombohedral-hexagonal replacement is well-known. Please see attached Exhibit 1, which illustrates the hexagonal structure of a lithium transition metal oxide.

Claim Rejections Under 35 U.S.C. §§ 102 and 103

Claims 1-8, 10-12, and 14 were rejected under 35 U.S.C. § 102(b) as anticipated by or, in the alternative, under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, pp. 642-43). The Examiner asserted that CL-010390 discloses a positive electrode material comprising $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$. This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested. The following is a comparison between the present invention, as claimed, and the cited prior art.

An aspect of the present invention, per claim 1, is a positive electrode active material comprising a lithium-containing composite oxide containing at least nickel and manganese elements, said positive electrode active material comprising primary particles of the composite oxide having a twinning portion, the composite oxide further contains cobalt element, and the nickel, manganese, and cobalt elements are uniformly dispersed at the atomic level.

The positive electrode active material of the present invention is not anticipated by or obvious in view of Ohzuku et al. because Ohzuku et al. do not disclose or suggest the composite oxide having a twinning portion and the composite oxide further containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, as required by claim 1.

As explained in the declaration under 37 C.F.R. § 1.132 by Dr. Yoshizawa, which was filed February 20, 2007, positive electrode active material fabricated according to Chemistry Letters, CL-010390 exhibit a non-uniform elemental distribution. Exhibit A, as indicated by the Co-rich and Co-poor areas, clearly shows a widely varying distribution of cobalt in the Chemistry Letters, CL-010390 positive electrode active material. In contrast thereto, Exhibits A and B clearly illustrate that cobalt is uniformly dispersed throughout the positive electrode material according to the present invention. As illustrated in Exhibits A and B, the material according to the present invention is clearly distinguishable over the prior art material.

In the micrographs attached to the declaration, red indicates a high concentration of the element being measured, green represents a low concentration, and yellow represents an intermediate concentration, for each of Ni, Mn, Co. Thus, the Co map only shows Co concentration, the Ni map only shows Ni concentration, and the Mn map only shows Mn concentration.

Because CoCO_3 and nickel manganese hydroxide are used as a raw material in CL-010390, segregation of Co is observed in the $\text{LiCo}_{1/3}\text{Ni}_{1/3}\text{Mn}_{1/3}\text{O}_2$. In contrast thereto, in the present invention a triple hydroxide is used as the raw material (*see* page 24, lines 14-15) resulting in a favorable dispersion of Co.

The Examiner asserted that Ohzuku et al. inherently disclose the claimed material. However, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1955, 1957 (Fed. Cir. 1993). "Inherency . . . may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999)(citations omitted). In view of the data presented in Dr. Yoshizawa's declaration it is clear that CL-010390 does not inherently disclose the positive electrode active material, as required by claim 1.

The factual determination of lack of novelty under 35 U.S.C. § 102 requires the disclosure in a single reference of each element of a claimed invention. *Helifix Ltd. v. Blok-Lok Ltd.*, 208 F.3d 1339, 54 USPQ2d 1299 (Fed. Cir. 2000); *Electro Medical Systems S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 32 USPQ2d 1017 (Fed. Cir. 1994); *Hoover Group, Inc. v. Custom Metalcraft, Inc.*, 66 F.3d 399, 36 USPQ2d 1101 (Fed. Cir. 1995); *Minnesota Mining & Manufacturing Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 24 USPQ2d 1321 (Fed. Cir. 1992); *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051 (Fed. Cir. 1987). Because Ohzuku et al. do not disclose positive electrode active material comprising primary particles of the composite oxide having a twinning portion, containing cobalt

element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, as required by claim 1, Ohzuku et al. do not anticipate claim 1.

Obviousness can be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. *In re Kotzab*, 217 F.3d 1365, 1370 55 USPQ2d 1313, 1317 (Fed. Cir. 2000); *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992); *In re Fine*, F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Ohzuku et al. do not suggest positive electrode active material comprising primary particles of the composite oxide having a twinning portion, containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, as required by claim 1.

The only teaching of the claimed positive electrode active material comprising primary particles of the composite oxide having a twinning portion, containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level is found in Applicants' disclosure. However, the teaching or suggestion to make a claimed combination and the reasonable expectation of success must not be based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Claim 9 was rejected under 35 U.S.C. § 103(a) as obvious over Ohzuku et al. (Chemistry Letters, CL-010390, Vol. 30 (2001), No. 7, pp. 642-43) in view of Miyasaka (U.S. Pat. No. 6,416,902). This rejection is traversed, and reconsideration and withdrawal thereof respectfully requested.

Claim 9 depends from claim 1 and is allowable for at least the same reasons as claim 1. The combination of Ohzuku et al. and Miyasaka does not suggest the claimed positive electrode

active material because Miyasaka does not cure the deficiencies of Ohzuku et al. Miyasaka does not suggest positive electrode active material comprising primary particles of the composite oxide having a twinning portion, containing cobalt element, and the nickel, manganese, and cobalt elements are **uniformly dispersed** at the atomic level, as required by claim 1.

The dependent claims are allowable for at least the same reasons as independent claim 1, and further distinguish the claimed positive electrode active material.

In view of the above amendments and remarks, Applicants submit that this Amendment should be entered, the application allowed, and passed to issue. If there are any questions regarding this Amendment or the application in general, a telephone call to the undersigned would be appreciated to expedite the prosecution of the application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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Crystal structural change from hexagonal to monoclinic

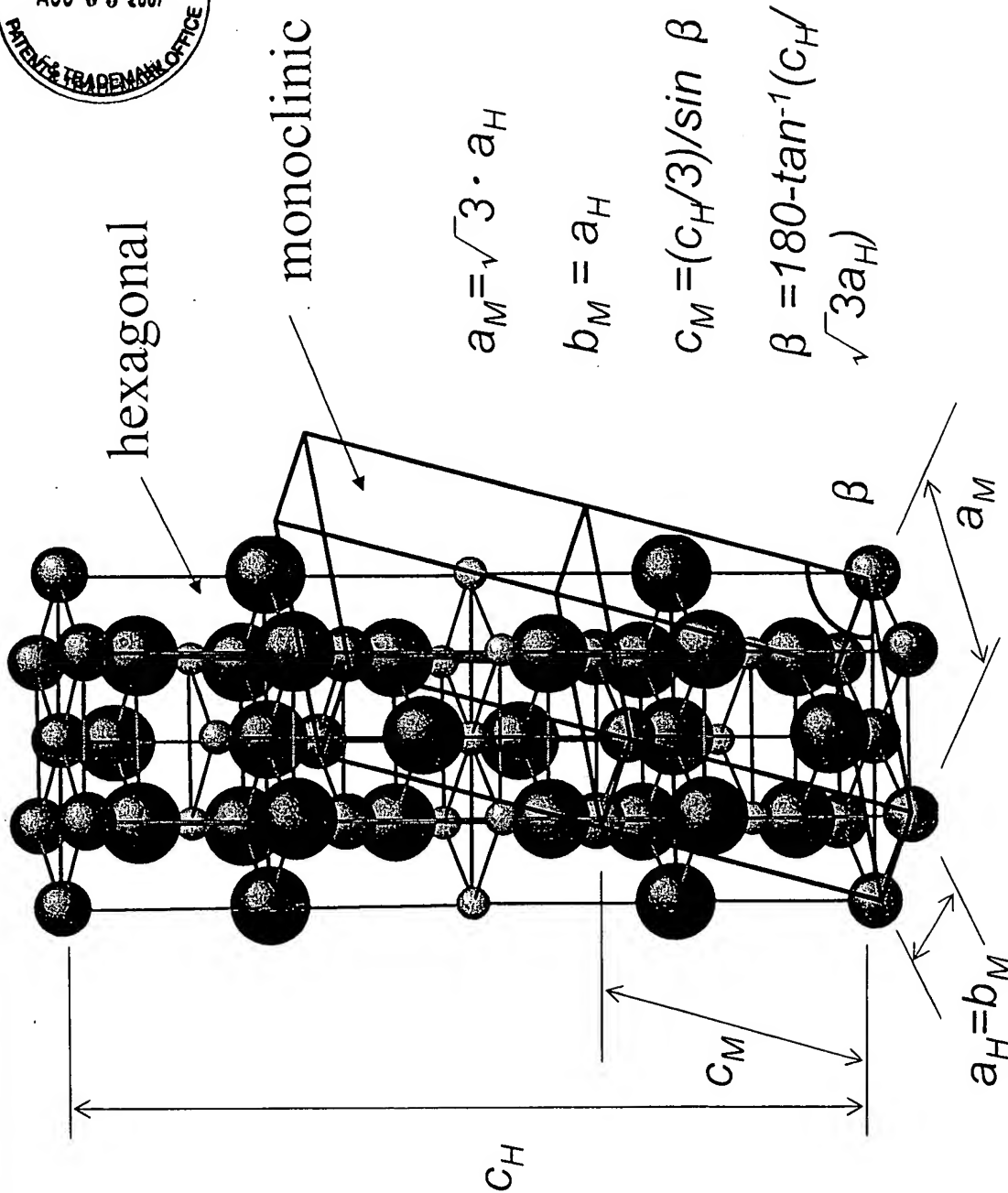
Matsushita Battery Industrial Co., Ltd., Technology Development Center



● Transition
metal

● Oxygen

● Lithium



e.g. $\beta = 121^\circ$ (hexagonal) $\rightarrow 110^\circ$

EXHIBIT 1